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THE USE OF ESSENTIAL OILS IN THE DEVELOPMENT OF DERMATO-COSMETIC PRODUCTS

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Abstract

In the last decade, due to market demand, the cosmetics industry has turned to products based on natural ingredients. Essential oils have aroused special interest due to the multitude of phytocompounds that this class includes (over 30,000) and their absolutely remarkable pharmacological actions (anti-inflammatory, antibacterial, antifungal, anti-aging, anti-wrinkle, regenerative, photoprotective). The purpose of the work was to evaluate the most important volatile oils used in the cosmetic industry. To achieve this goal, I consulted the database of several platforms looking for information related to the use of essential oils in cosmetology. Just a few of the volatile oils studied (chamomile oil, rosemary oil, respectively geranium oil diluted in carrier vegetable oils) can be used for direct application on the skin . However, the vast majority of volatile oils require caution when applied directly to the skin due to the dermatological reactions they can generate. Numerous studies have highlighted the anti-inflammatory, antibacterial, antiseptic, antioxidant action on the skin and anti-dandruff, anti-sebum, or stimulation of hair growth, whether we refer to essential oils incorporated in various pharmaceutical forms or using vegetable oils as a carrier.

Keywords*: essential oils, dermatology, chemical composition; skin*

Introduction

In recents years , there has been a reorientation of the pharmaceutical market towards products with an eco-sustainable profile close to the traditional products in relation to existing products derived from petrochemical sources.

The transition to natural cosmetic products was also made following the appearance of the new international regulation that prohibid in the production of cosmetics products. Plants provide important phytocompounds that can be used in the cosmetics industry, whether we are talking about creams (anti-aging or UV protection or against) and oral hygiene maintenance or weather we are referring to perfumes.

Among the groups of phytoconstituents used in the dermato-cosmetic industry, essential oils are the most important . Consumer demand for cosmetic products based on natural compounds, antioxidants, vitamins, essential oils, bacteria and biosurfactants stimulated bioresearch to incorporate these botanical extracts into a series of dermato-cosmetic products. Taking into account their antibacterial, antiseptic, analgesic, anti-inflammatory properties as well as their pleasant aroma essential oils have been incorporated into many cosmetic products .

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Material and methods

In order to prepare this article, I consulted the following databases : PubMed, Wiley Online Library PC, Scopus using as keywords: essential oils, therapeutic effects, dermato-cosmetology.

The search was carried out between March and July 2023, initially taking into account a number of 72 articles from which, after the screening, remained 18 articles from the period 2001-2023 written in English .

Essential oils – The chemical composition

Essential oils are volatile products of plant metabolism. They can be extracted from different parts of the plant such as the stem, leaves, flowers or even fruits, leaving the seeds and rarely the roots or rhizomes [1]. Essential oils can contain up to 100 compounds with low molecular weight, they have a strong odor .

From a chemical point of view, they include numerous classes, the main one being that of terpenes (mono-, sesqui and di-terpenes) respectively oxygenated compounds (alcohols, oxides, aldehydes, phenols, ketones, acids, esters).

Among the most representative terpenes are the monoterpenes with a distribution of over 90%, they also have a special structural variety [1]. Terpenes of natural origin are applicable in the cosmetic industry due to their high lipophilicity and low irritating power [2,3].

The accumulation of terpenes in the layers of the skin facilitates the permeation of the Stratum corneum and they can even enter the bloodstream in vivo [4]. Also limonene (terpenic hydrocarbon) ensures a better penetration of drugs with a lipophilic molecule . On the other hand, 1,8 cineole allows a better penetration of drugs with a hydrophilic substrate [2].

The therapeutic properties of the different classes of terpenes are correlated with their chemical structures as shown in table 1.

Table 1. The main chemical constituents of essential oils correlated with their therapeutic effects

Chemical class	Therapeutic effects	Examples
Alcohls	Strongly bactericidal, antiviral, analgesic , anti-infectious [5,6]	Linalool, geraniol, borneol, thymol, α-terpineol
Aldehydes	Anti-inflammatory, antiviral, sedative, vasodilators, hypotensors [1,5]	Citronellal, cuminal, geranial, neral, cinamal
Oxides	Expectorans, antiviral [1,6]	Linalool oxide, 1,4-cineole
Phenols	Immune stimulating, strong antibacterial [5,6]	Carvacrol, p-cresol
Ketones	Mucolytic, cell regenerative, neurotoxic [1,5,6]	Menthone, thujone, camphor, germacrone

Considering the multitude of phytoconstituents, we must also take into account the possibility of a synergistic effect ,in some cases or an antagonistic effect in others.

These mechanisms, however, are still insufficiently detailed, remaining rather ambiguous.The most important essential oils in dermato-cosmetology

The essential oils most often used in the cosmetic industry are rosemary oil, lavender oil, peppermint oil, thyme oil, bergamot oil, geranium oil, chamomile oil [7,8].

Fig. 1. Essential oils used in cosmetology

Rosemary oil (Rosmarinus officinalis) has antibacterial, antioxidant, cytotoxic and antimutagenic action, being used in traditional cosmetics [9]. Rosemary oil has an increased neurotoxicity due to the high content of camphor (5.8-24 %) , being contraindicated for epileptic patients [1].

Lavender oil (Lavandula officinalis) has antibacterial, antifungal and anti-inflammatory and analgesic properties, soothing irritated skin [10].

Peppermint oil (Mentha piperita) is rich in menthol, menthone and isomenthone. menthol has anesthetic properties, acting soothingly on irritated skin [11]. Its main constituent, menthol, increases membrane penetration, especially when associated with limonene. Peppermint oil has antifungal, antioxidant, antiallergic and antitumor action [12].

Thyme oil (Thymus vulgaris) stands out for its antioxidant and antibacterial action supported by its constituents : α-cadinene, γ-cadinene, ß-caryophyllene, ß-eudesmol, germacrene , ß-pinen, α-terpineol [13].

Chamomile oil (Matricaria chamomilla) has antioxidant action attributed to chamazulene and anti-inflammatory action determined by flavonoids, especially polyphenols [14].

Table 2. Essential oils used in cosmetics formulations

Application	Essential oil	Phytoconstituents	Therapeutic effects	Function	References
Skin care * Hair care	Rosemary	1,8 cineole, camphor verbenone, borneol	antibacterial, antioxidant	anti-acne hair growth conditioning	[7,8,9]
Hair care	Lavender	linalyl acetate, linalool lavandulol, lavandulol ac.	antibacterial antioxidant	hair growth conditioning	[10]
Hair care	Peppermint	menthol, menthone, isomenthone, 1,8-cineole	antibacterial antioxidant	male grooming hair growth conditioning	[11] [12]
Hair care	Thyme	α-cadinene, γ-cadinene germacrene , ß-pinen	antibacterial	antidandruff hair growth	[13]
Skin care *	Chamomille	1,8-cineole, limonene lavandulol, camphor	anti-inflammatory wound healing	anti-acne anti-aging	[14] [15]
Hair care	Bergamot	bergapten, bergamottin Limonene, ß-pinene	anti-inflammatory antibacterial	antidandruff hair growth	[16]
Hair care Perfumes Skin care *	Geraniol	geraniol, linalool citronellol, γ-eudesmol	antibacterial antifungals	anti-aging, oily skin	[17.18]

Chamomile oil can be applied to the skin, having antipruritic, anti-inflammatory, soothing action [15].

Bergamot oil (Citrus bergamia) has antibacterial, anti-inflammatory, analgesic and antiproliferative action especially supported by limonene . However, it requires special caution in direct application on the skin, when it is done it must be diluted in vegetable oils [16]

Geranium oil (Pelargonium graveolens) has antibacterial, antifungal, repellent properties, being known as a substitute for rose oil due to its very similar smell and lower costs [17].

Conclusions

Relying on the anti-inflammatory, antimicrobial, antioxidant properties and maintaining the brightness and youth of the skin, we can say that volatile oils represent an invaluable source for the cosmetic industry.

Just a few of the volatile oils studied (chamomile oil, rosemary oil, respectively geranium oil diluted in carrier vegetable oils) can be used for direct application on the skin .

However, the vast majority of volatile oils require caution when applied directly to the skin due to the dermatological reactions they can generate (pruritus, contact dermatitis phototoxicity).

The toxicity of volatile oils is dependent on the dose, dilution, composition and frequency of application and the use of essential oils diluted with vegetable carrier oils can be the solution to overcome these inconveniences.

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